



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application

Inventor: Debasis Bagchi

Appln. No.: 10/664,468

Conf. No.: 4351

Filed: September 17, 2003

Title: METHOD AND COMPOSITION OF ANTHOCYANIN-RICH BERRY  
EXTRACTS THAT PREVENTS OR INHIBITS ANGIOGENESIS AND  
HELICOBACTER PYLORI AND ACTS AS A POWERFUL ANTIOXIDANT  
THAT PROVIDES VARIOUS HEALTH BENEFITS

Art Unit: 1655

Examiner: Flood, Michele C.

Atty. Docket No.: IHEAL-01038US1

Customer No. 23910

DECLARATION OF INVENTOR UNDER 37 C.F.R. § 1.131

1. My name is Debasis Bagchi
2. I am a senior vice president of InterHealth Nutraceuticals.
3. I am in charge of product research and development at InterHealth Nutraceuticals.
4. I am a co-inventor of the invention described and claimed in the above U.S. patent application
5. I have published a number of learned treatises in the field of natural extracts.
6. I have given numerous presentations to scientists throughout the world on my research in the field of natural extracts.
7. I am a world renowned researcher in the field of nutraceuticals extracts.
8. I believe that a person having ordinary skill in the art would understand that the phrase "an extract of berries" to indicate an aqueous alcohol extract.
9. The undersigned, being hereby warned that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. §1001, and that such willful false statements may jeopardize the validity of the application or any resulting registration, declares that the facts set forth in this declaration are true; all statements made of his own knowledge are true; and all statements made on information and belief are believed to be true.

January 25, 2007  
Date

Debasis Bagchi  
Debasis Bagchi

## **CURRICULUM VITAE**

**DEBASIS BAGCHI, PH.D., FACN, CNS, MAIChE**

**Academic Address:** Department of Pharmacy Sciences  
School of Pharmacy & Health Professions  
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2500 California Plaza, Omaha, NE 68178  
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**Industrial Address:** Research & Development Division  
InterHealth Nutraceuticals Incorporated  
5451 Industrial Way, Benicia, CA 94510  
Phone: (707) 751-2850; Fax: (707) 751-2802  
Email: [dbagchi@interhealthusa.com](mailto:dbagchi@interhealthusa.com)

**Home Address:** 5332 Vista Point Court  
Concord, CA 94521  
Phone: (925) 673-8939; Cell: (925) 202-3018

**Personal Details:** **U.S. Citizen**  
Married, One Daughter  
Wife: Manashi Bagchi, Ph.D., FACN

### **Education:**

- 1982 Ph.D. in Medicinal Chemistry, Indian Institute of Chemical Biology, Calcutta, India
- 1980 A.M.I.I.Chem.E., Indian Institute of Chemical Engineers, Calcutta, India
- 1976 M.Sc. in Chemistry, Jadavpur University, Calcutta, India (First Class)
- 1973 B.Sc.(Chemistry Hons.), Jadavpur University, Calcutta, India (First Class)

Member, American Institute of Chemical Engineers, New York, NY, 2002

Designated "Certified Nutrition Specialist" from The Certification Board for Nutrition Specialists in 2001

Passed "Concepts in Toxicology (Pharm Sci 688/888)" three-credit hr course in Grade B+ from University of Nebraska Medical Center, Omaha in 1992

Passed "Materials-Logistics Management (GBA 637)" three-credit hr course in Grade A from Bowling Green State University, Ohio in 1987

Approved Pharmaceutical Manufacturing Chemist of the Directorate of Drugs Control (India) since 1981.

**Research and Professional Experience:**

- 10/04 - Senior Vice President, Research and Development, InterHealth Nutraceuticals Inc., Benicia, CA
- 08/00 – 10/04 Vice President, Research and Development, InterHealth Nutraceuticals Inc., Benicia, CA
- 08/00 - Professor, Department of Pharmacy Sciences, School of Pharmacy and Health Professions, Creighton University Medical Center, Omaha, NE
- 01/98 - 08/00 Director, Research and Development, InterHealth Nutraceuticals Inc., Concord, CA
- 04/98 - 08/00 Adjunct Associate Professor, Pharmaceutical and Administrative Sciences, Creighton University School of Pharmacy & AHP, Omaha, NE
- 12/99 - Visiting Associate Professor of Toxicology, Arnold and Marie Schwartz College of Pharmacy and Allied Health Sciences, Long Island University, Brooklyn, NY
- 07/93- 04/98 Associate Professor, Pharmaceutical and Administrative Sciences, Creighton University, Omaha, NE
- 01/91-06/93 Assistant Professor, Dept. of Pharmaceutical Sciences, Creighton University, Omaha, NE
- 10/90-12/90 Post-Doctoral Fellow, Department of Surgery, University of Connecticut School of Medicine, Farmington, CT
- 08/88-09/90 Development Manager, Research & Development, Berger Paints India Limited, Calcutta, India.
- 07/87-07/88 Post-Doctoral Fellow, Department of Surgery, University of Connecticut School of Medicine, Farmington, CT
- 01/86-07/87 Post-Doctoral Fellow, Chemistry Department, Bowling Green State University, Ohio
- 12/81-12/85 Research and Development Officer, Berger Paints India Limited, Calcutta, India.
- 03/77-12/81 Research Fellow, Medicinal Chemistry Division, Indian Institute of Chemical Biology (CSIR), Calcutta, India

**Industrial Expertise:**

- Organize, Direct and Perform Functions in the Research and Development Department, Collaborate with Marketing and Sales Team, and Coordinate to Enhance Company's Growth and Business.
- Design and Execute Research Activities to Support Structure Function Claims of Products.
- Develop Novel Concepts and Grow Company's Intellectual Property.
- Present Research Data in Scientific Conferences and Publish in Peer-Reviewed Journals.
- Identify and Introduce New Products Backed by Scientific Research.
- Develop and Implement New Analytical Techniques for Product Characterization and Quantification.
- Closely Monitor to Maintain Regulatory Compliances in the Company.

**Newsworthy Accomplishments in the Industry:**

- Successfully completed and published a series of Safety Studies and Obtained GRAS Status on Super CitriMax, a Novel Supplement for Weight Management, and ChromeMate, a Novel Niacin-Bound Chromium (III) for favorably regulating glucose-insulin sensitivity.
- Designed a novel Human Clinical Study jointly with Georgetown University Medical Center, Executed and Published Human Clinical Studies on Super CitriMax.

- Designed and Completed Nutrigenomics Study to Identify Obesity Regulatory Genes Modulated by Super CitriMax.
- Designed and Published more than 36 Peer-Reviewed Publications on ActiVin, a Novel GRAS-approved Grape seed-derived Proanthocyanidin Antioxidant.
- Demonstrated the Novel Anti-Angiogenic Properties of OptiBerry, a Novel combination of Berry Anthocyanins, in both in vitro and in vivo models.
- Designed and Published Mechanistic and Clinical Studies on Aller-7, a Novel Polyherbal Formulation from Medicinal Plants Designed to Ameliorate *allergic rhinitis*.
- Designed and Conducted Research Projects on Niacin-Bound Chromium to Ameliorate the Symptoms of Syndrome X.
- Designed and Completed Mechanistic Studies on Undenatured Collagen II, demonstrating its Efficacy Against Joint Pain.
- Introduced a Number of New Products in the Market
- Obtained a NIH SBIR Phase I Grant of \$ 149,800 from National Institutes of Health to Demonstrate the Pharmacologic Preconditioning Potential of Protykin, a Novel 50% Natural Extract of *trans*-Resveratrol from *Polygonum cuspidatum*.

### **Teaching:**

Received Approval for an Online Course entitled “Food and Nutrition Toxicology (PHA 477)” as Course Director from Creighton University School of Pharmacy and Allied Health Professions. The Course will be launched from August 2004.

Launched “Principles of Toxicology (PHA 476)” Online Course in January 2002 at Creighton University School of Pharmacy and Allied Health Professions as the Course Director.

Course Director and Instructor of the “Principles of Toxicology (PHA 476)” course at Creighton University School of Pharmacy and Allied Health Professions.

Instructor of the “Scholarly Project (PHA 500)” course at Creighton University School of Pharmacy and Allied Health Professions.

Teach the “Biophysical and Biochemical Significance of Meditation, and Natural Medicine and Antioxidants in Human Health” to the Pharmacy students taking “Survey of Alternative Medicine (PHA 310)” course.

Supervise Medicinal Chemistry and Toxicology research projects of undergraduate and graduate pharmacy students on rotation at Creighton University School of Pharmacy and Allied Health Professions.

Guest Lecturer and Examiner of M.Tech.(Chemical Technology) of Calcutta University, Calcutta, India for the sessions 1988-89 and 1989-90

### **Editorial Activities:**

2001 Edited a Forum Issue on “Nutritional Proanthocyanidins, Flavonoids, and Related Phenols” [ISSN: 1523-0864] jointly with Professor Catherine A. Rice-Evans, Antioxidant Research Group, Wolfson Centre for Age-Related Diseases, King’s College London, London SE1 9RT, UK, in Mary Ann Liebert, Inc’s Peer-Reviewed Journal “Antioxidants & Redox

Signaling” Volume 3, No 6, pp. 939-1166, December 2001.

- 2004 Edited a Special Issue on “Nutraceutical and Functional Food Industries: Aspects on Safety and Regulatory Requirements” [ISSN: 0378-4274] jointly with Professor Harry G. Preuss, Georgetown University Medical Center, Washington, DC, and Professor James P. Kehrer, The University of Texas at Austin, Austin, TX, in Elsevier’s Peer-Reviewed Journal “Toxicology Letters” Volume 150, No 1, pp. 1-134, April 15, 2004.
- 2005 Edited a Book entitled “Phytopharmaceuticals in Cancer Chemoprevention” [ISBN 0-8493-1560-3; Cost: US\$ 139.95] jointly with Professor Harry G. Preuss, Georgetown University Medical Center, Washington, DC, for CRC Press LLC, Boca Raton, FL.
- 2006 Edited a Special Issue on “Nutraceuticals and Functional Foods Regulations in the United States and Around the World” [ISSN: 0300-483X] in Elsevier’s Peer-Reviewed Journal “Toxicology” Volume 221, No 1, pp 1-134, April 3, 2006.

#### **Grants and Awards:**

- 2004 Received Mark A. Bieber Award from the American College of Nutrition for Industrial Research Excellence and contribution to National Nutrition Alliance
- 2003-2004 National Institutes of Health funded SBIR Phase I research project entitled “Resveratrol as a pharmacological preconditioning agent” 1R43 HL075665-01 [Principal Investigator, \$ 149,800]
- 2002-2005 Health Future Foundation funded research project entitled “Establishment of a Toxicology Research Center” at School of Pharmacy and Health Professions, Creighton University Medical Center [Co-Principal Investigator; \$850,000; July 1, 2002 to June 30, 2005]
- 1998-2000 National Institutes of Health (National Cancer Institute) funded research project entitled “Helicobacter pylori, Oxidative Stress and Gastric Injury” [Principal Investigator; \$ 97,272; April 23, 1998 to March 31, 2000]
- 1996-1999 U.S. Air Force Office of Scientific Research (Bolling AFB, OH) funded research project entitled “Common pathways in the toxicity of structurally diverse xenobiotics” [Co-principal Investigator; \$ 339,097; November 1, 1996 to October 31, 1999]
- 1995-1996 State of Nebraska Department of Health funded research project entitled “Role of free radicals in fat promoted pancreatic cancer” [Co-Principal Investigator; \$ 30,000; July 1, 1995 to June 30, 1996]
- 1995-1996 The Nebraska Department of Health, Cancer and Smoking Disease Program funded research project entitled “*Helicobacter pylori*-derived protein toxin, free radicals and gastric cancer” [Principal Investigator; \$ 18,580; Feb 1, 1995 to June 30, 1996]
- 1995-1996 The Nebraska Department of Health, Cancer and Smoking Disease Program funded research project entitled “Esophageal free radical production and DNA changes in a rat alkaline reflux model: a long term study” [Co-Principal Investigator; \$ 19,871;

Feb 1, 1995 to June 30, 1996]

- 1994-1996 Health Future Foundation Faculty Development Award and Grant for studies on the project entitled "*Helicobacter pylori*-induced oxidative stress and gastric injury" [Principal Investigator; \$ 10,000; July 1, 1994 to June 30, 1996]
- 1993-1994 Health Future Foundation Faculty Development Award and Grant for studies on the project entitled "Role of reactive oxygen species in the neurotoxicity of polyhalogenated cyclic hydrocarbons (PCH), chlorinated acetamide (CAH) and organophosphate pesticides (OPS)" [Principal Investigator; \$ 10,000; July 1, 1993 to Oct 31, 1994]
- 1993-1994 Biomedical Research Support Grant (BRSG-NIH) for work on the project entitled "*Helicobacter pylori*-induced oxidative stress in association with gastric cells" [Principal Investigator; \$ 5,000; Mar 1, 1993 to Feb 28, 1994]
- 1995-1996 American Heart Association Summer Student Research Fellowship on the project entitled "Myocardial ischemia-reperfusion via percutaneous transluminal coronary angioplasty: oxidative stress and DNA damage" [\$ 1,500; July 1, 1995 to June 30, 1996]
- 1999-2000 The Procter & Gamble Company (Cincinnati, OH) funded research project entitled "Spicy food, high-fat diet and alcohol as inducers of oxidative stress in human gastric mucosa and the protective ability of bismuth subsalicylate (BSS) in this model of mucosal injury" [Principal Investigator; \$ 41,250; February 1, 1999 to February 1, 2000].
- 1997-1998 Received a Travel Grant of \$ 5,000 from the Procter & Gamble Company (Mason, OH) to Attend, Chair and Present Research Findings in the International Conference on Stress Adaptation, Prophylaxis and Treatment held in Calcutta, India, during January 10-12, 1998.
- 1997-1998 InterHealth Nutritionals Inc. (Concord, CA) funded research project entitled "Protective Ability of ActiVin against acute and chronic stress-induced gastrointestinal injury" [Co-Principal Investigator; \$ 5,000; September 1, 1997 to June 30, 1998]
- 1997-1998 InterHealth Nutritionals Inc. (Concord, CA) funded research project entitled "Protective effect of a novel Grape Seed Proanthocyanidin extract on smokeless tobacco extract-induced oxidative stress and apoptotic cell death in a primary culture of human oral keratinocyte cells" [Co-Principal Investigator; \$ 14,500; April 1, 1997 to January 31, 1998]
- 1997-1998 The Procter & Gamble Company (Cincinnati, OH) funded research project entitled "Chronic stress-induced oxidative gastrointestinal mucosal injury in Sprague-Dawley rats, and protective ability of bismuth subsalicylate" [Principal Investigator; \$ 13,974; October 1, 1997 to June 30, 1998].
- 1997-1998 Abbott Laboratories (Abbott Park, IL) funded research project entitled "*Helicobacter pylori*-induced oxidative stress in human gastric cells, and the protective ability of Clarithromycin" [Principal Investigator; \$ 16,000; January 1, 1997 to January 31,

1998].

- 1997-1997 InterHealth Nutritionals Inc. (Concord, CA) funded research project entitled "Cytotoxicity of Grape Seed Proanthocyanidins towards human cancer cells" [Principal Investigator; \$ 24,244; March 1, 1997 to December 31, 1997]
- 1996-1997 The Procter & Gamble Company (Mason, OH) funded research project entitled "Necrotizing agent induced oxidative stress in cultured human gastric cells, and protective ability of bismuth subsalicylate (BSS)" [Principal Investigator; \$ 33,963; November 1, 1996 to November 30, 1997].
- 1996-1997 The Procter & Gamble Company (Mason, OH) funded research project entitled "Restraint stress, diet, and chemically-induced oxidative injury in the gastrointestinal tissue, and the protective ability of bismuth subsalicylate"[Principal Investigator; \$ 29,998; February 15, 1996 to February 14, 1997].
- 1996-1997 DMV Nutritionals (Fraser, NY) funded research project entitled "*In vitro* and *in vivo* free radical scavenging ability of Lactoferrin" [Principal Investigator; \$ 20,862; March 1, 1996 to February 28, 1997]
- 1996-1997 InterHealth Nutritionals Inc. (Concord, CA) funded research projects entitled "Induction of antioxidant enzymes in the hepatic, brain and serum following supplementation of zinc salts and Vitamin E" and "*In vitro* and *in vivo* free radical scavenging ability of Proanthocyanidin" [Principal Investigator; \$ 60,500; March 1, 1996 to June 30, 1997]
- 1994-1995 The Procter & Gamble Company (Mason, OH) funded research project entitled "Prevention of oxidative gastrointestinal tissue injury by colloidal bismuth subcitrate and bismuth subsalicylate" [Principal Investigator; \$ 24,420; Oct 1, 1994 to Sept 30, 1995]
- 1994-1995 InterHealth Company (Concord, CA) funded research project entitled "*In vitro* and *in vivo* Oxygen radical scavenging ability of zinc salts" [Principal Investigator; \$ 20,291; March 1, 1994 to June 30, 1995]

#### **Honors:**

- 2006 Invited by the Organizing Committee of the 7<sup>th</sup> International Conference and Exhibition on Nutraceuticals and Functional Foods (WorldNutra 2006 held in Silver Legacy Resort, Reno, NV, during November 5-8, 2006) to deliver a talk entitled "Antioxidants and Gene Expression in Personalized Menus: Lessons to Learn for Supplements and Formulated Products" in the Pre-Conference Symposium entitled "Antioxidants: Health Benefits, Market Trends, and Product Formulation" on November 5.
- 2006 Invited by the Organizing Committee of the 7<sup>th</sup> International Conference and Exhibition on Nutraceuticals and Functional Foods (WorldNutra 2006 held in Silver Legacy Resort, Reno, NV, during November 5-8, 2006) to Organize and Chair a Symposium entitled "Diabetes and Metabolic Syndrome: A Journey from Childhood to Old Age" and to deliver a talk entitled "Diabetes and Metabolic Syndrome: A Mechanistic Exploration" on November 8.
- 2006 Invited by the Organizing Committee of the 6<sup>th</sup> Conference of the European Chapter of the

- American College of Nutrition on “Nutrition in Obesity and Cancer” held in Golden Bay Hotel 5\*, Larnaca, Cyprus, during October 26-28, 2006) to Chair Session 1 entitled “New Insights in Cancer Metabolism” on October 27, and to deliver a talk entitled “Human Adipocyte Transcriptome and Function in Response to Treatment by a Novel Calcium/Potassium Salt of (-)-Hydroxycitric Acid” on October 28.
- 2006 Elected as the Vice President of the American College of Nutrition, Clearwater, FL.
  - 2006 Invited by the Organizing Committee of the 47th Annual Meeting of the American College of Nutrition (October 5-8, 2006) to Organize and Chair a Symposium entitled “Vitamin E Today: The Emerging Face of Tocotrienols in Health and Disease” on October 7, 2006, at Grand Sierra Resort, Reno, NV.
  - 2006 Invited by the Organizing Committee of the 47th Annual Meeting of the American College of Nutrition (October 5-8, 2006) to Organize and Chair a Symposium entitled “French Paradox Revisited: Wine and Heart Health” and to deliver a talk entitled “Potentiation of a Survival Signal in the Ischemic Heart by Resveratrol through p38MAPK-MSK-1-CREB Signaling” on October 8, 2006, at Grand Sierra Resort, Reno, NV.
  - 2006 Invited by the Organizing Committee of the 232nd American Chemical Society National Meeting and Exposition (September 10-14, 2006) to deliver a talk entitled “Effect of Niacin-Bound Chromium (NBC) on Plasma Lipid Profile and Genome-Wide Transcriptome of Subcutaneous Adipose Tissue” in the Functional Foods and Health Symposium on September 12, 2006, at San Francisco Marriott (Room Nob Hill C), San Francisco, CA.
  - 2006 Chair-Elect, Nutraceuticals and Functional Foods Division, Institute of Food Technology, Chicago, IL.
  - 2006 Reviewer of United States Army Research Grants on Gulf War Illness Research Program (AIBS)
  - 2006 General Secretary and Treasurer, American College of Nutrition, Clearwater, FL.
  - 2006 Member of Dean’s Scientific Advisory Council of University of Houston College of Pharmacy, Houston, TX.
  - 2005 Invited by the Organizing Committee of the International Conference on Free Radicals and Antioxidant in Health Disease and Radiation & Annual Conference of Society for Free Radical Research – India (SFRR – India) held in Science City Auditorium, Calcutta, India during January 16-18, 2006, to Organize and Chair a Symposium entitled “Natural Products in Human Health and Disease Prevention” and to deliver a talk entitled “Effect of a Novel Calcium/Potassium Salt of (-)-Hydroxycitric Acid on Neuropeptide Y Levels *in vitro*” on January 17.
  - 2005 Invited by the Organizing Committee of the International Chemical Congress of Pacific Basin Societies (Pacifichem 2005) held in Honolulu, Hawaii, during December 15-20, 2005 to deliver a talk entitled “Novel Antioxidant and Antiangiogenic Properties of Edible Berry Anthocyanins” in the Symposia 44 entitled “Chemistry and Biochemistry of Antioxidative Phytochemicals” on December 16.
  - 2005 Invited by the Organizing Committee of the International Chemical Congress of Pacific Basin Societies (Pacifichem 2005) held in Honolulu, Hawaii, during December 15-20, 2005



- to deliver a talk entitled “Mechanism of Appetite Suppression by a Natural Extract of (-)-Hydroxycitric Acid” in the Symposia 77 entitled “Food and Nutraceutical Bioactives in Health Promotion and Disease Prevention” on December 15.
- 2005 Elected as the General Secretary and Treasurer of the American College of Nutrition, Clearwater, FL.
  - 2005 Invited by the Organizing Committee of the 6<sup>th</sup> International Conference and Exhibition on Nutraceuticals and Functional Foods (WorldNutra 2005 held in Crowne Plaza Anaheim Resort, Anaheim, CA, during October 16-19, 2005) to deliver a talk entitled “Role of a Novel Calcium-Potassium salt of (-)-Hydroxycitric Acid, Niacin-Bound Chromium and *Gymnema sylvestre* Extract in Weight Management” in the Pre-Conference Symposium entitled “Products and Ingredient Formulations for Weight Management and Wellness” on October 16.
  - 2005 Invited by the Organizing Committee of the 6<sup>th</sup> International Conference and Exhibition on Nutraceuticals and Functional Foods (WorldNutra 2005 held in Crowne Plaza Anaheim Resort, Anaheim, CA, during October 16-19, 2005) to Organize and Chair a Symposium entitled “Sarcopenia, Metabolic Syndrome and Preventive Nutrition” and to deliver a talk entitled “Role of Exercise and Nutrition in Advancing Age-Related Disorders” on October 18.
  - 2005 Invited by the Organizing Committee of the 6<sup>th</sup> International Conference of the Society for Free Radical Research (September 26-29, 2005) to Organize and Chair a Workshop on “Micronutrients in Human Health” and to deliver a talk entitled “Role of Zinc, An Essential Micronutrient, in Human Health and Disease Prevention” on September 26 in Abdelmalek Essadi University, Faculty of Sciences, Tetouan, Morocco.
  - 2005 Invited by the Organizing Committee of the 46th Annual Meeting of the American College of Nutrition (September 22-25, 2005) to Organize and Chair a Symposium entitled “Sarcopenia, Fat Gain and Advancing-Age: Preventive Nutrition and Lifestyle Changes” and to deliver a talk entitled “Nutritional Supplements for Advancing Age Related Sarcopenia” on September 23 at Kiawah Island Resort, SC.
  - 2005 Invited by the Organizing Committee of the Chromium and Human Health Workshop sponsored by Maine Center for Toxicology and Environmental Health held in Abromson Center for Community Education, University of Southern Maine, Portland, ME, during August 18-19, 2005, to deliver a talk entitled “Chromium (VI), Oxidative Stress and Apoptotic Cell Death” on August 19.
  - 2005 Invited to Serve as a Peer-Review Committee Member of the United States Air Force Office of Scientific Research, Washington, DC.
  - 2005 Invited by the Organizing Committee of the 47<sup>th</sup> Annual World Congress of International College of Angiology held in Uncasville, CT, during July 23-26, 2005, to deliver a talk entitled “Novel Anti-Angiogenic and Anti-Carcinogenic Properties of Edible Berry Anthocyanins” on July 25.
  - 2005 Invited by the Program Committee of the 44th Annual Meeting and ToxExpo organized by the Society of Toxicology held in New Orleans, LA, during March 6-10, 2005, to serve as a

- Chairman of the Session entitled “Food Safety and Nutrition Toxicology I” on March 9.
- 2005 Invited by the Organizing Committee of the International Conference on “Antioxidants & Free Radicals in Health-Nutrition & Radioprotectors” and “IV Annual Conference of the Society for Free Radical Research in India (SFRR)” held in Bangalore, India, during January 10-12, 2005, to Chair a Symposium entitled “Free Radicals and Antioxidants in Human Reproduction and Infertility” on January 11 and to deliver a talk entitled “Molecular Mechanisms of Weight Management by a Novel (-)-Hydroxycitric acid Extract (HCA-SX)” on January 12.
- 2005 Member of the Board of Directors of the American College of Nutrition, Clearwater, FL.
- 2005 Member of Dean’s Scientific Advisory Council of University of Houston College of Pharmacy, Houston, TX.
- 2005 Invited to Serve as a Peer-Review Committee Member of the United States Department of Agriculture (USDA), Washington, DC.
- 2004 Invited by the Food Science and Nutrition Department of the University of Tokyo to deliver a talk on the “Molecular Mechanisms of Obesity Regulation by a Novel, Natural Extract of (-)-Hydroxycitric Acid from *Garcinia cambogia*” on November 19, 2005, in Tokyo, Japan.
- 2004 Invited by the Organizing Committee of the 17<sup>th</sup> Annual and International Meeting of the Japanese Association for Animal Cell Technology (JAACT2004) on Industrial Application of Animal Cell Technology held in Yagoto Mulberry Hotel, Nagoya, Japan, during November 15-18, 2004, to Chair a Symposium entitled “Functional Substances in Food and Natural Sources” on November 18 and to deliver a talk entitled “Anti-angiogenic and anti-inflammatory properties of berry anthocyanins and AKBA-enriched *Boswellia* extract” on November 17.
- 2004 Invited by the Organizing Committee of the 5<sup>th</sup> International Conference and Exhibition on Nutraceuticals and Functional Foods (WorldNutra 2004 held in San Francisco, CA, during November 7-10, 2004) to Organize and Chair a Symposium entitled “Obesity, Weight Management and Nutraceuticals” and to deliver a talk entitled “Obesity Epidemiology and Statistics, Natural Supplements, Regulatory Genes and Controlling Parameters” on November 8.
- 2004 Elected as a Member of the Board of Directors of the American College of Nutrition, Clearwater, FL.
- 2004 Invited to Review U.S. Army-Funded Research Projects on Gulf War Illness.
- 2004 Invited by the Organizing Committee of the 45th Annual Meeting of the American College of Nutrition (September 30 – October 3, 2004) to Organize and Chair a Symposium entitled “Intricate Issues of Food and Supplement Labeling Guidelines” and to deliver a talk entitled “Case Study: Weight Loss Claims for Nutraceuticals and Functional Foods” on October 2 in Long Beach, CA.
- 2004 Member of the Dean’s Scientific Advisory Council of University of Houston College of Pharmacy, Houston, TX.
- 2004 Invited by the Program Committee of the 5<sup>th</sup> International Conference of the Society for Free Radical Research held in Saint Lucia during July 21-24, 2004, to serve as a Chairman of the

- Session IV on July 22, and to deliver a talk entitled “Modulation of body weight and abdominal fat gene expression following supplementation of a novel (-)-hydroxycitric acid extract” on July 23.
- 2004 Invited by the Program Committee of the 43<sup>rd</sup> Annual Meeting and ToxExpo organized by the Society of Toxicology held in Baltimore, MD, during March 21-25, 2004, to serve as a Chairman of the Session entitled ”Oxidative Stress II” on March 25.
- 2004 Invited by the Organizing Committee of the “International Conference on Natural Products, Free Radicals and Radioprotectors in Health (NFRH – 2004), The Third Annual Meeting of SFRR - India” (January 17-19, 2004) to Chair a Symposium entitled “Beneficial Effects of Natural Products in Human Health” and to deliver a talk entitled “Mechanism of weight management by a novel, natural extract of (-)-hydroxycitric acid (HCA-SX) derived from *Garcinia cambogia*” held on January 18 at Annamalai University, Chidambaram, India.
- 2004 Served as the Council Coordinator of the “Dietary Supplements/Nutraceuticals/Functional Foods/Vitamins Council” of the American College of Nutrition.
- 2003 Invited to Review U.S. Army-Funded Research Projects on Gulf War Illness.
- 2003 Invited by the Organizing Committee of the 44th Annual Meeting of the American College of Nutrition (October 9-12, 2003) to Co-Chair a Symposium entitled “Use of Natural Supplements in Obesity: An Emerging Paradigm” and to deliver a talk entitled “Obesity, Epidemiology, Genetic Influences, Regulatory Genes and Supplements” on October 10 in Nashville, TN.
- 2003 Member of Dean’s Scientific Advisory Council of University of Houston College of Pharmacy, Houston, TX.
- 2003 Invited by the Organizing Committee of the 4<sup>th</sup> International Conference and Exhibition on Nutraceuticals and Functional Foods (Worldnutra 2003) to Co-Chair the Nutrigenomics and Angiogenesis Session (Session 15) on October 1, 2003, in the Meeting held in The Riviera Hotel Conference Center, Las Vegas, NV, during September 29 – October 1, 2003.
- 2003 Invited by the Organizing Committee of the 5<sup>th</sup> MCBN-UNESCO/COSTAM/SFRR (Malayasia/Asean) Workshop on “Micronutrients: Molecular Basis of Health and Disease” to Chair the Flavonoid Session (Session 1) on July 18, 2003, in the Meeting held in Nexus Resort Karambunai, Kota Kinabalu, Sabah, Malayasian Borneo, during July 16-20, 2003.
- 2003 Invited by the Organizing Committee of the 5<sup>th</sup> MCBN-UNESCO/COSTAM/SFRR (Malayasia/Asean) Workshop on “Micronutrients: Molecular Basis of Health and Disease” to deliver a talk entitled “Regulation of angiogenesis by grape seed proanthocyanidins, resveratrol and berry anthocyanins” in the Flavonoid Session (Session 1) on July 18, 2003, in the Meeting held in Nexus Resort Karambunai, Kota Kinabalu, Sabah, Malayasian Borneo, during July 16-20, 2003.
- 2003 Invited by the Organizing Committee of the 2003 IFT (Institute of Food Technologists, Chicago, IL) Annual Meeting to deliver a talk entitled “Angiogenic and Anti-Angiogenic Properties of Natural Polyphenolic Antioxidants” in the Angiogenesis and Functional Foods Session (Session 32) on July 14, 2003, in the Meeting held in McCormick Place South,

Chicago, IL, during July 12-16, 2003.

- 2003 Invited by the Organizing Committee of the International Symposium on “Inflammatory and Oxidative Cell Death and Tissue Damage: Molecular Mechanisms, Biomarkers, and Chemoprevention” to Chair Session V on May 29, 2003, in the Meeting held in College of Pharmacy, Seoul National University, South Korea, during May 28-29, 2003.
- 2003 Invited by the Organizing Committee of the International Symposium on “Inflammatory and Oxidative Cell Death and Tissue Damage: Molecular Mechanisms, Biomarkers, and Chemoprevention” to deliver a talk entitled “Novel Anti-Allergic, Anti-Inflammatory and Anti-Spasmodic Activities of Aller-7, a Safe, Novel Botanical Formulation” on May 28, 2003, in the Meeting held in College of Pharmacy, Seoul National University, South Korea, during May 28-29, 2003.
- 2003 Invited by the Organizing Committee of the 1e Congress voor Nutri- & Fytotherapie (April 5, 2003) to deliver a talk entitled “Polyphenolic Antioxidants and Cardioprotection” in Amsterdam, The Netherlands.
- 2003 Invited by the Program Committee of the 42<sup>nd</sup> Annual Meeting and ToxExpo organized by the Society of Toxicology in Salt Lake City, UT, during March 9-13, 2003, to serve as a Chairman of the Platform Session entitled “*In Vitro* Models of Hepatotoxicity” on March 12.
- 2003 Served as the Council Coordinator of the “Dietary Supplements/Nutraceuticals/Functional Foods/Vitamins Council” of the American College of Nutrition.
- 2003 Appointed as a Member of the SSS-3 Study Section and Peer Review Committee of the National Institutes of Health (Bethesda, MD).
- 2002 Invited by the Organizing Committee of the 2<sup>nd</sup> International Conference on Mechanisms and Actions of Nutraceuticals (October 6-9, 2002) to deliver a talk entitled “Phytoestrogens, Resveratrol and Women’s Health” in the Symposium entitled “Nutraceuticals for Neurodegenerative Diseases” in Krems, Austria.
- 2002 Invited by the Organizing Committee of the 2<sup>nd</sup> International Conference on Mechanisms and Actions of Nutraceuticals (October 6-9, 2002) to deliver a talk entitled “Mechanism of Weight Management by a Novel, Natural Extract of (-)-Hydroxycitric Acid (HCA-SX) and a Combination of HCA-SX plus Niacin-Bound Chromium (NBC) and *Gymnema Sylvestre* Extract (GSE)” in the Symposium entitled “Nutraceuticals as Life Style Drugs” October 8 in Krems, Austria.
- 2002 Invited by the Organizing Committee of the 43rd Annual Meeting of the American College of Nutrition (October 3-6, 2002) to Chair a Symposium entitled “Perspective on Nutraceutical and Functional Foods” and to deliver a talk entitled “Nutraceutical Toxicology and Safety” on October 3 in San Antonio, TX.
- 2002 Invited by the Organizing Committee of the 43rd Annual Meeting of the American College of Nutrition (October 3-6, 2002) to Chair a Symposium entitled “Controversies in Nutrition: Risk/Benefit Ratios of Controversial Supplements” and to deliver a talk entitled “Chromium: Does it Work and Is It Safe?” on October 6 in San Antonio, TX.
- 2002 Invited to deliver a talk entitled “Cytotoxicity and oxidative mechanisms of different forms

- of chromium” on September 9, 2002, in the 2<sup>nd</sup> Conference on Molecular Mechanisms of Metal Toxicity and Carcinogenesis organized by the National Institute of Occupational Safety and Health in Morgantown, WV, during September 8-11, 2002.
- 2002 Invited by the Chinese Pharmaceutical Association and Chinese Academy of Preventive Medicine to deliver a talk entitled “Phytoestrogens, resveratrol and women’s health” in the Workshop on Biological Effects of Resveratrol held in Beijing, China, on August 28, 2002.
- 2002 Invited by the Organizing Committee of the 6<sup>th</sup> Annual International Symposium on Aging Skin to deliver a talk entitled “Roles of Natural Antioxidants and Regulatory Proteins in Wound Healing: An Emerging Paradigm” on May 30, 2002, in the Meeting held in Chicago, IL, during May 30-June 2, 2002.
- 2002 Invited by the Organizing Committee of American Society of Bariatric Physicians (ASBP) to deliver a talk entitled “Weight Management and Mechanism of Appetite Suppression by a Natural Extract of (–)-Hydroxycitric Acid” on May 18, 2002, in the Annual Meeting held in Denver, CO, during May 16-18, 2002.
- 2002 Invited by the CRC Press, Boca Raton, FL, to co-edit a book entitled “Phytopharmaceuticals in Cancer Chemoprevention and Therapy”.
- 2002 Invited by the Program Committee of the 41<sup>st</sup> Annual Meeting and ToxExpo organized by the Society of Toxicology in Nashville, TN, during March 17-21, 2002, to serve as a Chairman of the Session entitled “Food Safety & Nutrition” on March 19.
- 2002 Invited by the Organizing Committee of the First Annual Nutrition Week: A Scientific and Clinical Forum and Exposition (San Diego, CA, February 23-27, 2002) to chair a Symposium entitled “Supplement and Nutraceutical Remedies for Disease (S14)” held on February 24 and to deliver an invited talk entitled “Supplements in Cancer Prevention” on February 24.
- 2002 Appointed as a Member of the SSS-3 Study Section and Peer Review Committee of the National Institutes of Health (Bethesda, MD).
- 2001 Invited by the Organizing Committee of the International Symposium on “Dietary and Medicinal Antimutagens and Anticarcinogens: Molecular Mechanisms and Chemopreventive Potential” (October 17-19, 2001) to deliver a talk entitled “Molecular mechanism of cardioprotection by a novel grape seed proanthocyanidin extract” on October 17 in Centennial Hall, Yonsei University, Seoul, Korea.
- 2001 Invited and Served as a Guest Editor jointly with Professor Catherine A. Rice-Evans, Ph.D., Kings College, London, UK, in a Forum Issue entitled “**Nutritional Phytochemicals**” in the esteemed journal “**Antioxidants & Redox Signaling**”. This issue (Volume 3, Number 6, December 2001, pp. 939-1165) consists of Review, Original Research and Methods from distinguished researchers in the field including Drs. John M. Pezzutto, Catherine A. Rice-Evans, Sheila Wiseman, Augustine Scalbert, Ginnette Serrero, Kaisu Maatta, Wolf Bors, Paul A. Kilmartin and others.
- 2001 Invited by the Procter & Gamble Company (Cincinnati, Ohio) to participate in a discussion to reevaluate the potential for *residronate*, an osteoporosis medicine.
- 2001 Invited by the Organizing Committee of the 42nd Annual Meeting of the American College

- of Nutrition (October 3-7, 2001) to deliver a talk entitled “Beneficial roles of chromium, selenium, zinc, and vanadium on insulin resistant syndrome” on October 7 in Orlando, FL.
- 2001 Invited by the American College for Advancement in Medicine to deliver a talk entitled “Role of resveratrol in women’s health” on May 13 in the ACAM Spring Conference on *New Advances in Complementary Medicine* held in Nashville Convention Center, Nashville, TN, during May 11-13, 2001.
- 2001 Invited by the Organizing Committee of Vitafoods 2001 (April 24-26, 2001) to deliver a lecture entitled “Phytoestrogen, Women’s Health and Resveratrol” on April 24 in Geneva, Switzerland.
- 2001 Invited by the Organizing Committee of the 2<sup>nd</sup> International Conference on “Oxidative Stress and Aging: Technologies for Assessment and Intervention Strategies” to serve as a Plenary Speaker in the “Dietary Antioxidants” session. The symposium was held in Royal Lahaina Resort, Maui, Hawaii, during April 2-5, 2001. Delivered a talk entitled “Antioxidants in Grape Seed Proanthocyanidin Research: Chemical, Biochemical and Molecular Approaches”.
- 2001 Appointed as a Member of the SSS-3 Study Section and Peer Review Committee of the National Institutes of Health (Bethesda, MD).
- 2000 Invited by the Organizing Committee of the 41st Annual Meeting of the American College of Nutrition (October 12-15, 2000) to Chair the Session entitled “Update on Natural Supplement Use in Various Condition” on October 15 in Las Vegas, NV.
- 2000 Invited by the Organizing Committee of the 41st Annual Meeting of the American College of Nutrition (October 12-15, 2000) to deliver a talk entitled “Supplements in Cancer Prevention and Therapy” on October 15 in Las Vegas, NV.
- 2000 Appointed as a Member of Peer Review Committee of the Gulf War Illness Research Program [Panel C Toxicity of Militarily -Relevant Heavy Metals] organized by the American Institute of Biological Sciences (Washington, DC).
- 2000 Invited by the Organizing Committee of the National Nutritional Food Association (NNFA) to deliver a talk entitled “What is New About Probiotics” in the Annual Meeting of NNFA held in Las Vegas, NV, on July 27, 2000.
- 2000 Appointed as a Member of the SSS-3 Study Section and Peer Review Committee of the National Institutes of Health (Bethesda, MD).
- 1999 Invited by the Organizing Committee of the SFRR Europe Winter Meeting on Bio-flavonoids and Polyphenols in Health & Disease held in Dinard, France, during December 2-5, 1999, to Chair the Signal Transduction Session on December 4.
- 1999 Invited by the Organizing Committee of the Primer Simposio Internacional de Fitofarmacos held in Santiago, Chile, during September 23-24, 1999, to deliver a one-hour lecture entitled “Proantocianidinas de la Semilla de la Uva. Fronteras en la Investigacion de Antioxidantes on September 24.
- 1999 Appointed as a Member of the General Medicine A-2 and ALTX-4 Study Sections and Peer Review Committees of the National Institutes of Health (Bethesda, MD).

- 1999 Invited by the Organizing Committee of the International Conference on Emerging Potential of Antioxidant Therapy EPAT 1999 held in Goa, India, during January 9-11, 1999, to Chair the Workshop-cum-Symposium Session entitled "Wine in Health and Disease Prevention" on January 9.
- 1999 Invited by the Organizing Committee of the National Nutritional Food Association (NNFA) to deliver a talk entitled "New Frontiers of Cancer Research" in the Annual Meeting of NNFA in Las Vegas, NV, in July 1999.
- 1998 Invited by the Organizing Committee of the 39th Annual Meeting of the American College of Nutrition (October 1-4, 1998) to Chair the Session entitled "Free Radicals, Apoptosis, and Human Health: Role of Antioxidants" on October 4, 1998 in Albuquerque, NM.
- 1998 Invited by the Organizing Committee of the 39th Annual Meeting of the American College of Nutrition (October 1-4, 1998) to serve as an Antioxidant Expert in the Meet-the-Expert Session on October 2, 1998 in Albuquerque, NM.
- 1998 Invited by the Organizing Committee of the National Nutritional Food Association (NNFA) to deliver a talk entitled "Probiotics for Human Health" in the Annual Meeting of NNFA in San Antonio, TX, in July 1998.
- 1998 Invited by the Organizing Committee of the 27th International Conference *Nutritional Medicine Today* (April 24-26, 1998) to deliver a one-hour talk entitled "Environmental Stress, Free Radicals and Human Diseases: The Role of Antioxidants and Micronutrients" on April 25, 1998 in Vancouver, Canada.
- 1998 Invited by the Organizing Committee of the *International Conference on Stress Adaptation, Prophylaxis and Treatment* (January 10-12, 1998) to Chair the Session entitled "Oxidative Stress and Protection" on January 11, 1998 in Calcutta, India.
- 1998 Invited by the Indian Aluminium Company (Calcutta, India) to Organize and Conduct a Workshop entitled "Stress Management for Professionals" on January 8, 1998 in Calcutta, India.
- 1997 Invited by the American College for the Advancement of Medicine to organize a Workshop entitled "Free Radical Theory of Aging" and "Antioxidant Analysis for Cancer Research" in the Fall Convention (October 31, 1997 to November 2, 1997) held in Anaheim, CA.
- 1997 Invited as a Research Consultant by the Procter & Gamble Company (Cincinnati, OH) to deliver a talk entitled "Free radicals, oxidative stress and DNA damage: Role of antioxidants and micronutrients" and to participate in a Roundtable Discussion on the role of oxidative stress in viral infection on August 14 and 15, 1997.
- 1997 Invited as a Research Consultant by the Procter & Gamble Company (Cincinnati, OH) and to participate in a Group Discussion on Gastroprotective Mechanisms on March 18, 1996 and March 31, 1997.
- 1997 Invited by the InterHealth Company (Concord, CA) as a Research Consultant and as a Forum Speaker in the Antioxidant Conference September 1995 (Baltimore, MD), Antioxidant Conference October 1996 (Baltimore, MD), Antioxidant Conference March 1997 (Anaheim, CA) and Antioxidant Conference September 1997 (Baltimore, MD).
- 1996 Invited by the American College for the Advancement of Medicine to deliver a Invited

Lecture entitled "A Review of the Clinical Benefits of Coenzyme Q<sub>10</sub>" in the ACAM Fall Convention (October 31, 1996 to November 3, 1996) in Palm Springs, CA.

1995 Appointed as a member of the Ad Hoc Trichloroethylene Stakeholder Committee, Toxicology Division of the Armstrong Laboratory, Wright-Patterson Air Force Base, Dayton, Ohio

### **Major Research Expertise:**

**Prime:** Oxidative stress, Free Radicals and Antioxidant Research, Obesity and Diabetes Research, Intricate Issues of Syndrome X Pathophysiology, Gene Expression, cDNA Microarray Analysis

**Others:** Cell Biology, Nitric Oxide Pathophysiology, HPLC, GC-MS, ESR, Gel Electrophoresis, Northern and Western Blot Analysis, Laser Scanning Confocal Microscopy, Flow Cytometry and Alteration in Cell Cycle, Apoptotic Cell Death, Organic Syntheses of Chemoprotectants, Glycosidase Inhibitors and Typhostins, Mechanistic Pathways of Antioxidant Cytoprotection, Evaluation of Free Radical Scavengers, Antioxidants and Chemoprotectants, Toxicological Studies

### **Research Activities:**

Ph.D. Thesis: "Chemical Investigation of *Anaphalis araneosa* DC" Isolation, characterization and structural elucidation of flavonoids and natural products from *Anaphalis araneosa*, a medicinal plant possessing antifertile activity. Two new flavonoids and one bipyrene were characterized and their total syntheses were accomplished. The bipyrene was observed to possess potent antitumor activity.

Post-Doctoral Research: Worked on the mechanism of oxidative stress and oxygen free radicals generation during reperfusion of ischemic myocardium. The dose- and time-dependent scavenging effects of specific free radical scavengers and various drugs including captopril and lisinopril were assessed. The levels of lactate dehydrogenase, creatine kinase, prostaglandin and thromboxane were measured at various time points to understand the extent of cellular injury induced by oxidative stress and repair mechanism by various scavenging agents and drugs. Established techniques for the detection of hydroxyl radical as DMPO-OH spin adduct and salicylate-OH adduct and 8-hydroxydeoxyguanosine using HPLC. Established a novel mechanism of action of an angiotensin converting enzyme inhibitor, captopril, as a free radical scavenger. Mechanism of calcium influx during the reperfusion of ischemic myocardium was established and the dose- and time-dependent protection by various calcium channel blockers including nifedipine, nimodipine and nisoldipine were assessed.

Synthesized various chemoprotectants including glycosidase inhibitors 'brominated and fluorinated glycosides' and EGF receptor specific tyrosine kinase inhibitors 'tyrphostins', and assessed the free radical scavenging abilities.

Research Project 1992-1995: Investigated the mechanistic pathways of oxidative stress induced by various toxicants including structurally diverse pesticides, transition metals and solvents, responsible for hepatic, brain and gastrointestinal injury, tumor promotion and cancer. Also, determined the mechanistic pathways of myocardial ischemia-reperfusion injury. *In vitro* and *in vivo* concentration or dose and time dependent lipid peroxidation, LDH leakage, chemiluminescence, cytochrome c and



iodonitrotetrazolium reduction, nitric oxide production, DNA-single strand breaks, DNA fragmentation, glutathione depletion, induction of heat shock (stress) proteins, membrane microviscosity, activation of protein kinase C, oxidative stress inducible proteins etc. were assessed to identify the extent of cellular injury.

Identified oxidative-stress inducible protein at 90 kDa in response to endrin, chlorpyrifos, fenthion and alachlor using SDS-polyacrylamide gel electrophoresis, Northern and Western blot analyses. The in vivo induction of differential heat shock gene expression in liver, brain, heart and lungs by selected pesticides including endrin, chlordane, alachlor, fenthion and chlorpyrifos were also monitored by Northern blot analyses using specific cDNA probes for stress/heat shock proteins as well as probes for protooncogenes. Western blot analyses were also conducted using suitable antibodies. Endrin, chlorpyrifos, fenthion and alachlor dramatically induced expression of HSP89 $\alpha$  and HSP89 $\beta$  genes in the hepatic and brain tissues of rats. Attempts will be taken in future studies to explore the role of low doses of these pesticides in ameliorating the problem of specific diseased states as cell transformation. All these data will provide the mechanistic pathways of tissue injury/tumor promotion induced by various pesticides/toxicants and accordingly design and syntheses of suitable chemotherapeutic agent(s) will be possible in future studies.

Investigated the role of reactive oxygen species and oxidative DNA damage in *Helicobacter pylori*-induced gastric injury. Induction of oxygen free radicals, DNA-single strand breaks and eukaryotic hsp90 (heat shock protein 90) was observed following interaction of *H.pylori* and cultured human gastric adenocarcinoma cells. Also, worked on a 87 kDa protein cytotoxin producing *H.pylori* strain and determined enhanced production of oxygen free radicals in association with human gastric adenocarcinoma cells, as compared to a *H.pylori* strain in which the cytotoxin gene has been disrupted. Concentration-dependent scavenging abilities of selected free radical scavengers, antioxidants and histamine H<sub>2</sub>-receptor antagonists were determined.

#### Research Projects Since 1993:

- A. Established a highly specific and exceedingly accurate technique for the simultaneous identification and quantitation of urinary and serum lipid metabolites including malondialdehyde, formaldehyde, acetaldehyde, methyl ethyl ketone, acetone and propionaldehyde using HPLC in conjunction with GC-MS in an in vivo model. These lipid metabolites may serve as convenient and novel non-invasive biochemical markers of oxidative stress and the subsequent production of oxidative tissue damage. This technique has been successfully implemented in the quantitation of enhanced production of lipid metabolites in the rat heart perfusate during ischemia and reperfusion. In 1995, Armstrong Toxicology Laboratory of the Wright-Patterson Air Force Base has inducted me as a member of the Ad-Hoc Trichloroethylene (TCE) Stakeholder Committee, and this group is actively engaged in assessing the oxidative tissue damage in the human volunteers following exposure to TCE. At Creighton University, we are presently working on the human urine and serum samples and are in the process of establishing the urinary and serum lipid metabolites as biomarkers of TCE exposure.

In a separate project, we are analyzing the above mentioned biochemical markers by analyzing the biological fluids from control and diseased human subjects undergoing percutaneous transluminal coronary angioplasty (PTCA) for urinary and serum metabolites, and 8-hydroxy-2'-deoxyguanosine. Our previous studies have demonstrated that

concentrations of oxygen free radicals increase dramatically between 60 and 210 sec of reperfusion, and the PTCA technique is predominantly used for myocardial revascularization and is widely used in patients with congestive heart failure and/or coronary artery diseases. PTCA basically facilitates reperfusion of ischemic myocardium, and we are assessing the protective role of aspirin, a potent free radical scavenger, and other antioxidants, which can be employed in conjunction with PTCA therapy.

- B. Culturing normal human gastric cells from *H.pylori*-negative endoscopic biopsies from human subjects. We are evaluating concentration-dependent oxidative stress, oxidative DNA damage, and apoptotic cell death on these gastric cells by *H.pylori*. We are also assessing intracellular oxidized states by Laser Confocal Microscopy of these gastric cells following exposure to *H.pylori*. The 87 kDa protein cytotoxin producing *H.pylori* strain is being extensively investigated to determine the mechanism and role of this cytotoxin in human gastric injury. The protective abilities of various antioxidants and histamine H<sub>2</sub>-receptor antagonists and other drugs are also being studied.
- C. Established the role of transition metal salts including cadmium and chromium salts, on the induction of oxidative stress and intracellular oxidized states, modulation of intracellular oxidized states, DNA fragmentation, and apoptotic cell death in cultured J774A.1 cells. Presently, investigating the role of these transition metal salts on the alteration of cell cycle by Flow Cytometry in human leukemic and normal human peripheral blood mononuclear cells.
- D. Culturing human oral epithelial cells from human oral tissues. We have demonstrated the role of smokeless tobacco on the induction of oxidative stress, collagen synthesis, and induction of Hsp 90 in these cells.

In a parallel project, we are culturing human alveolar macrophage cells from human broncho alveolar lavage samples. We are assessing the role of smokeless tobacco extract and its constituents on the induction of oxidative stress and oxidative DNA damage in these macrophage cells. This project will be extended to determine the effects of cigarette smoke on human alveolar macrophage cells.

- E. The cytoprotective mechanism of selected oxygen free radical scavengers including superoxide dismutase, catalase, mannitol, DMSO, and allopurinol, various antioxidants such as  $\beta$ -carotene, vitamin C, BHA, BHT, vitamin E, vitamin E succinate, grape seed and pine bark proanthocyanidins, bioflavonoids, resveratrol, melatonin, methionine, ellagic acid, coenzyme Q<sub>10</sub>, lactoferrin, and seleno-organic compounds, membrane stabilizers including lazaroids, zinc salts such as zinc methionine, zinc gluconate, zinc sulfate, zinc picolinate and zinc oxide, bismuth salts including colloidal bismuth subcitrate and bismuth subsalicylate, glycosidase inhibitors, typhostins, histamine H<sub>2</sub>-receptor antagonists, and tumor necrosis factor alpha antibody etc. are being explored extensively at various concentration and/or dose and time points in *in vitro* as well as in *in vivo* models. These studies are being conducted to ameliorate the toxic manifestations induced by structurally diverse pesticides, transition metal salts and solvents.

#### **Industrial Experience:**

Obtained six years of research experience (December 1981 to December 1985; and August 1988 to September 1990) in Berger Paints India Limited, Calcutta, India, initially as a Research & Development Officer, then as a Junior Manager and later as a Senior Manager. Responsibilities included toxicological assessment of speciality, antifungal and protective coatings, especially for coatings to be used in food industries. Extensive experience in coordinating general, developmental and reproductive toxicology, as well as conducting and interpreting acute oral toxicity, dermal toxicity, dermal irritation, eye irritation, LD<sub>50</sub> and other relevant studies, 90-day toxicity, long-range multiple-dose chronic toxicity, carcinogenicity and teratogenicity experiments.

Currently, serving as a Senior Vice-President of Research & Development of InterHealth Nutraceuticals, Benicia, CA, since January 1998. Responsible for coordinating and conducting research projects to support structure function claims, design and execution of biotechnology projects, design of human clinical studies, extensive toxicological and teratological evaluation of new and existing products for safety data, GRAS (Generally recognized as Safe) status and regulatory requirements, and new product development. Prime focus includes obesity and diabetes research, intricate aspects of metabolic syndrome and Syndrome X, and antioxidant research.

Recently, coordinated the GRAS approval process for Pycnogenol (Horphag International, Geneva, Switzerland) and Super CitriMax (InterHealth N.I., Benicia, CA, USA). Both the products received the GRAS approval.

**Membership of Learned Societies:**

Society of Toxicology (Member)

American College of Nutrition (Fellow)

American Institute of Chemical Engineers (Member)

The New York Academy of Sciences (Member)

Society for Free Radical Biology and Medicine (SFRBM)

American Association for the College of Pharmacies (Member)

Phi Beta Delta (Honor Society for International Scholars)

**Reviewer of Peer Reviewed Journals:**

Archives of Environmental Contamination and Toxicology

Archives of Toxicology

Atherosclerosis

Biochimica et Biophysica Acta

Biological Trace Element Research

Bioorganic & Medicinal Chemistry Letters

Cancer Letters

Cancer Research

Environmental Pollution

Environmental Research

FEBS Letters

Food and Chemical Toxicology

Free Radical Biology & Medicine

Free Radical Research

Hormone and Metabolic Research

International Journal of Pancreatology  
Journal of Agricultural and Food Chemistry  
Journal of Inorganic Biochemistry  
Journal of Pharmacy and Pharmacology  
Journal of Toxicology - Clinical Toxicology  
Life Sciences  
Molecular Pharmacology  
Molecular and Cellular Biochemistry  
Mutation Research  
Neoplasia  
Oncology  
Oncogene  
Preventive Medicine  
Scandinavian Journal of Rheumatology  
Thrombosis Research  
Toxicology  
Toxicology Letters

**Members of the Editorial Board:**

Toxicology Letters  
Antioxidants & Redox Signaling  
The Original Internist  
Research Communications in Pharmacology and Toxicology  
International Journal of Geriatric Urology and Nephrology (General Nephrology and Geriatric Nephrology Section)

**Training Activities:**

Professional, Graduate and Undergraduate Students and Fellows who have received research training:

Phillip Stockwell  
Jeffrey Moser  
Julia Kelly  
Dan Muldoon  
Gerold Wetscher  
Paul Hinder  
Natsu Katada  
Phillip J. Vuchetich  
Lin Tang  
Minh X. Tran  
Sherryl Sato  
Lawrence Chinn  
Roger L. Krohn  
Amit Garg  
Bridget Buchanan  
Keith Mele  
James E. Dix.  
Jeffrey T. Dix

Gregory Wilson  
Richard Samuel  
Brett G. Sherman  
Casey B. Williams  
Michelle McCambly  
Mark Milnes  
Wendy Liu  
Thu Dao  
Jay Saiki  
Phuong Nguyen  
Yun Yee Chong  
Anh Le  
Onkemetse Kibitwe

## LIST OF PUBLICATIONS

1. E. Ali, D. Bagchi and S.C. Pakrashi, New flavonoids from *Anaphalis araneosa* DC. Phytochemistry, **18**: 356-357 (1979).
2. E. Ali, D. Bagchi and S.C. Pakrashi, Helipyron from *Anaphalis araneosa* and its synthesis. Phytochemistry, **21**: 243-244 (1982).
3. P.K. Dutta, D. Bagchi and S.C. Pakrashi, Synthesis of araneol and araneosol, the flavonoids from *Anaphalis araneosa* DC. Indian J. Chem., **21B**: 1037-1038 (1982).
4. D. Bagchi and R.K. Malakar, Pollution hazards, measures and their control in the perspective of surface coating industries. Paintindia, **36**: 19-27 (1986).
5. D.K. Das, D. Bagchi, R.M. Engelman, R. Subramanian, M.R. Prasad, R. Jones, G. Cordis and H. Otani, The effect of polymorphonuclear leukocyte derived free radicals on myocardial cell function in the isolated perfused rat heart. In Medical, Biochemical and Chemical Aspects of Free Radicals (O. Hayashi, E. Niki, M. Kondo and T. Yoshikawa, eds.), Elsevier Science Publishers, B.V., Amsterdam, pp 1355-1358 (1989).
6. D. Bagchi, M.R. Prasad and D.K. Das, Direct scavenging of free radicals by captopril, an angiotensin converting enzyme inhibitor. Biochem. Biophys. Res. Commun. **158**: 52-57 (1989).
7. D. Bagchi, J. Iyengar, P. Stockwell and D.K. Das, Enhanced prostaglandin productions in the ischemic-reperfused myocardium by captopril linked with its free radical scavenging action. Prostaglandin, Leukotrienes and Essential Fatty Acids **38**: 145-150 (1989).
8. D. Bagchi, D.K. Das, R.M. Engelman, M.R. Prasad and R. Subramanian, Polymorphonuclear leukocytes as potential source of free radicals in the ischemic-reperfused myocardium. Eur. Heart J. **11**: 800-813 (1990).
9. X. Chen, C.N. Gillis, D. Bagchi and D.K. Das, Lisinopril, ramiprilat and captopril reduce free radical-induced salicylate hydroxylation. Supplement to Circulation - Abstracts from the 64th Scientific Sessions of American Heart Association **84**, II-283, 1125 (1991).
10. D. Bagchi, M. Bagchi and D.K. Das, Generation of hydroxyl radical from the reactions of chlorite, lactate, and an unsaturated olefinic derivative: A novel mechanism of hydroxyl radical production in ischemic-reperfused myocardium. In Oxygen Radicals, Proceedings of the 5th International Congress on Oxygen Radicals: Active Oxygen, Lipid Peroxides and Antioxidants (K. Yagi, M. Kondo, E. Niki and T. Yoshikawa, Eds.), Excerpta Medica, Amsterdam, New York, pp 77-80 (1991).
11. D. Bagchi, M. Bagchi, E. Hassoun and S.J. Stohs, Effect of endrin on the hepatic distribution of iron and calcium in female Sprague-Dawley rats. J. Biochem. Toxicol. **7**: 37-42 (1992).
12. M.A. Shara, P.H. Dickson, D. Bagchi and S.J. Stohs, Excretion of formaldehyde, malondialdehyde, acetaldehyde and acetone in the urine of rats in response to 2,3,7,8-tetrachlorodibenzo-p-dioxin, paraquat, endrin and carbon tetrachloride. J. Chromatog. **576**: 221-233 (1992).

13. M. Bagchi, E.A. Hassoun, D. Bagchi and S.J. Stohs, Endrin-induced increases in hepatic lipid peroxidation, membrane microviscosity and DNA damage in rats. Arch. Environ. Contam. Toxicol. **23**: 1-5 (1992).
14. D. Bagchi, M. Bagchi, D.M. Douglas and D.K. Das, Generation of singlet oxygen and hydroxyl radical from sodium chlorite and lactic acid. Free Rad. Res. Commun. **17**: 109-120 (1992).
15. D. Bagchi, M. Bagchi, E. Hassoun and S.J. Stohs, Endrin-induced urinary excretion of formaldehyde, acetaldehyde, malondialdehyde and acetone in rats. Toxicology **75**: 81-89 (1992).
16. R. Roll, D. Bagchi, R. Marbello, A. Ali, C. Hodgson and B. Boman, Growth response to epidermal growth factor and EGF-receptor tyrosine kinase inhibitor in DiFi rectal carcinoma cells. Proceedings of the 83rd Annual Meeting of the American Association for Cancer Research **33**: 80 (1992).
17. E.A. Hassoun, D. Bagchi, V.F. Roche and S.J. Stohs, An assessment of potential chemoprotectant activity against ricin toxicity by mechanism based glycosidase inhibitors in macrophage J774A.1 cell cultures. Toxicon **30**: 1545-1554 (1992).
18. D. Bagchi, P.H. Dickson and S.J. Stohs, The identification and quantitation of malondialdehyde, formaldehyde, acetaldehyde and acetone in serum of rats. Toxicol. Meth. **2**: 270-279 (1992).
19. M. Bagchi, E.A. Hassoun, D. Bagchi and S.J. Stohs, Production of reactive oxygen species by peritoneal macrophages, and hepatic mitochondria and microsomes from endrin-treated rats. Free Rad. Biol. Med. **14**: 149-155 (1993).
20. Tosaki, D. Bagchi, A. Hellegouarch, T. Pali, G.A. Cordis and D.K. Das, Comparison of ESR and HPLC methods for the detection of hydroxyl radicals in ischemic / reperfused hearts. A relationship between the genesis of free radicals and reperfusion arrhythmias. Biochem. Pharmacol. **45**: 961-969 (1993).
21. G.A. Cordis, N. Maulik, D. Bagchi, R.M. Engelman and D.K. Das, Estimation of the lipid peroxidation in the ischemic and reperfused heart by monitoring lipid metabolic products using high performance liquid chromatography. J. Chromatog. **632**: 97-103 (1993).
22. X. Liu, R.M. Engelman, Z. Weis, D. Bagchi, J.A. Rousou, D. Nath and D.K. Das, Attenuation of myocardial reperfusion injury by reducing intracellular calcium overloading with dihydropyridines. Biochem. Pharmacol. **45**: 1333-1341 (1993).
23. D. Bagchi, M. Bagchi, E. Hassoun and S.J. Stohs, Carbon tetrachloride-induced urinary excretion of formaldehyde, malondialdehyde, acetaldehyde and acetone in rats. Pharmacology **47**: 209-216 (1993).
24. D. Bagchi, M. Bagchi, E. Hassoun, J. Moser and S.J. Stohs, Effects of carbon tetrachloride, menadione and paraquat on the urinary excretion of malondialdehyde, formaldehyde, acetaldehyde and acetone in rats. J. Biochem. Toxicol. **8**: 101-106 (1993).
25. E. Hassoun, M. Bagchi, D. Bagchi and S.J. Stohs, Comparative studies on lipid peroxidation and DNA-single strand breaks induced by lindane, DDT, chlordane and endrin in rats. Comp. Biochem. Physiol. **104C**: 427-431 (1993).

26. D. Bagchi, E.A. Hassoun, M. Bagchi and S.J. Stohs, Protective effects of antioxidants against endrin-induced hepatic lipid peroxidation, DNA damage, and excretion of urinary lipid metabolites. Free Rad. Biol. Med. **15**: 217-222 (1993).
27. J. Moser, D. Bagchi, P.I. Akubue and S.J. Stohs, Excretion of malondialdehyde, formaldehyde, acetaldehyde and acetone in the urine of rats following an acute and a chronic dose of ethyl alcohol. Alcohol Alcoholism **28**: 287-295 (1993).
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## PATENTS

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2. Method for preventing or reducing stress-induced gastric injury using grape seed proanthocyanidin extract. Inventors: D. Bagchi, M. Bagchi and S.J. Stohs. United States Patent #US 6,291,517, Date of Patent: September 18, 2001.
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